TRACKBOX INSTALLATION GUIDE

STRUCTURE OF THE DEVICE

Location, temperature and use of the device set some restrictions for selecting the model. Both models are fixed installations using same type of hardware platform and front panel, although the accessory module might slightly differ depending on the model.

Model descriptions

STANDARD MODEL: BASIC TRACKING FEATURES

- In addition to basic tracking functions, this model offers capability for GSM and NMEA data transfer through the configuration port. (Local data transfer requires the BwTrackbox cable, which is an accessory and sold separately.)
- Equipped with continuing power supply: Contains a built-in charger with 10-30VDC input power supply and a Li-Ion battery.
- Li-Ion batteries available for the device are: A standard battery 1700 mAh or a backup battery 650mAh. (Li-Ion 650, 900, 1200 mAh are also approved, but might not be provided by the manufacturer)
- Possibility to use an external Pb battery (12V), as well. Pb battery needs a separate charger (NOTE: Neither one is provided by the manufacturer).

I/O MODEL: ADVANCED TRACKING FEATURES

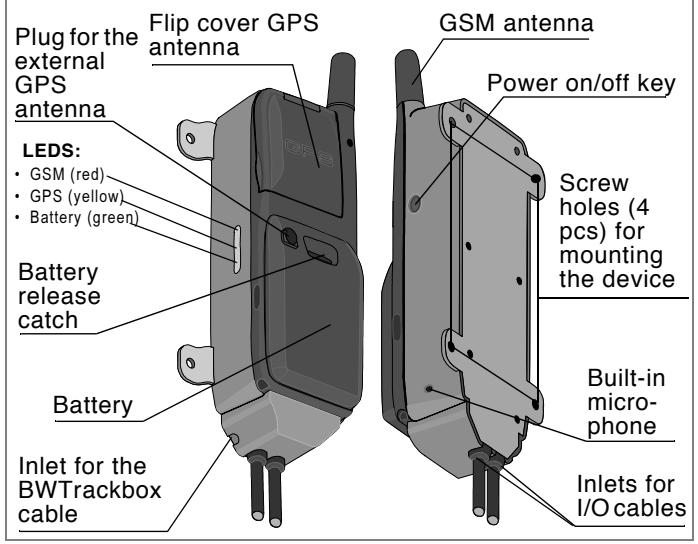
Otherwise the same as the standard model, but additionally the I/O model contains full I/O functionality and an Event log.

- The I/O functionality comes with 9+1 digital inputs, 8 digital outputs, and 4 analogue inputs. Inputs and outputs are for integrating special functions with the device. Such functions could be, e.g. a car immobilization system, an alarm system, registration of opened doors/liquid level/temperature changes and so on.
- Event log is used for storing positions and I/O events, which can be recalled afterwards and even remotely by making a CSD-data call.

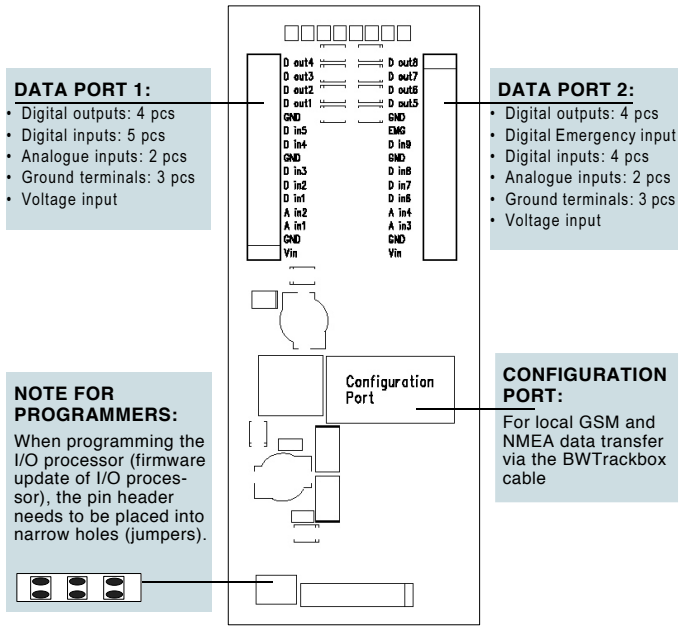
Pins available for the I/O model

Function	PCB	Function	PCB
Digital Input	D_in1	Digital Output	D_out1
Digital Input	D_in2	Digital Output	D_out2
Digital Input	D_in3	Digital Output	D_out3
Digital Input	D_in4	Digital Output	D_out4
Digital Input	D_in5	Digital Output	D_out5
Digital Input	D_in6	Digital Output	D_out6
Digital Input	D_in7	Digital Output	D_out7
Digital Input	D_in8	Digital Output	D_out8
Digital Input	D_in9	Ground	GND
Emergency	EMG	Ground	GND
Analog Input	A_in1	Ground	GND
Analog Input	A_in2	Ground	GND
Analog Input	A_in3	Ground	GND
Analog Input	A_in4	Ground	GND
Vin 10-32 VDC	Vin	Vin 10-32 VDC	Vin

TRACKBOX (outer structure)



Accessory module (inner structure)


DATA PORT 1:
• Digital outputs: 4 pcs
• Digital inputs: 5 pcs
• Analogue inputs: 2 pcs
• Ground terminals: 3 pcs
• Voltage input
DATA PORT 2:
• Digital outputs: 4 pcs
• Digital Emergency input
• Digital inputs: 4 pcs
• Analogue inputs: 2 pcs
• Ground terminals: 3 pcs
• Voltage input
D out4 D out3 D out2 D out1 GND D in5 D in4 GND D in3 D in2 D in1 A in2 A in1 GND Vin
D out8 D out7 D out6 D out5 GND EMG D in9 GND D in8 D in7 D in6 A in4 A in3 GND Vin
Configuration Port
NOTE FOR PROGRAMMERS:
When programming the I/O processor (firmware update of I/O processor), the pin header needs to be placed into narrow holes (jumpers).
CONFIGURATION PORT:
For local GSM and NMEA data transfer via the BWTrackbox cable

DIGITAL INPUTS

An external, wired input switch can be connected to the device. Total number of digital input pins is 9+1. One input is reserved for emergency use. The other inputs can be used for logging or sending status messages. Inputs can be used concurrently with outputs.

Grounding activates input. After grounding, the device will get a signal. Grounding of the input pin1 sends the status message1 to the service center number while grounding of the input pin2 sends the status message2 etc. If configured, grounding of the input pin will store the event and position on Event log, instead of sending the message. Logging can be used concurrently with sending, as well.

Digital inputs can also be configured to have a response time to ignore short pulses. A value for response time can be set, e.g. to 2 seconds, excluding the time needed for an SMS transfer.

Digital input pins are protected against AC/DC overvoltage and current.

- Max. voltage: 30 VDC
- Impedance: High.

ANALOGUE INPUTS

Device includes 4 analogue inputs that could work concurrently with other pins. Analogue inputs can be used for e.g. measuring liquid level changes. Threshold values for high and low can be set to trigger alarm.

- Voltage: 0 - 10 VDC.

DIGITAL OUTPUTS

An external device can be connected to an output pin. Device includes 8 outputs that could work concurrently with inputs.

Sending an MPTP command to the device will activate or deactivate the pin. Additionally a short pulse can be generated to output for indicating and logging rotation.

- Max. voltage: 30 VDC
- Max. current: 300 mA

SPECIAL NOTES CONCERNING OUTPUTS AND GROUNDS:

- Use separate Ground wires for power and outputs.
- Never connect more than 3 Outputs with 1 Ground wire.

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MECHANICS AND ENVIRONMENTAL EFFECTS

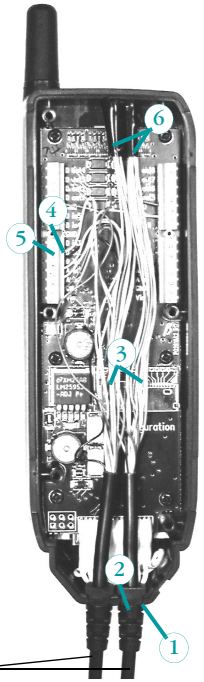
Assembling the device

NOTE: First make all the internal connections (see the picture below). **Only after the assembling is completed, the battery and the external voltage input (power cord) can be connected to the device.**

B: CONNECTING PINS

The I/O cable contains conducting wires (3) for pins.

Stick a wire into a pin hollow (4) and fasten it by screwing on the top of the corresponding terminal block (5).
-Standard model: Connect the ground (e.g. black wire, -), and voltage input (e.g. red wire, +).
-I/O model:
In addition to grounds and voltage inputs, connect the desired I/O pins.



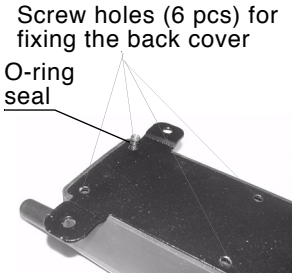
C: COMPLETING INTERNAL CONNECTIONS

After the conducting wires are connected to terminal blocks, the wires left unconnected must be insulated, e.g. by cutting out the peeled ends of the wires, or fastening these ends with a piece of firm tape(6).

A: CONNECTING I/O CABLES

Pierce a hole in the I/O cable inlet (1). NOTE: If you intend to use only one I/O cable, leave the other inlet intact. Direct the I/O cable through the inlet and place the cable clamp (2) in place.

SCREWING THE BACK COVER



You may screw the back cover back in after the device is completely assembled and the initial configuration (made by Benewin software) is done. For more on configuring the device by Benewin, see *The Trackbox operating instructions.*

When screwing the back cover to the device, use the O-ring seals for improving splash-proofing.

Installation

MOUNTING

1. Place the flat back cover towards a desired surface, e.g. a wall.
2. Mount the device by fixing and securing screws through the screw holes. Alternatively the device can be mounted by using a bush ring installation, for example in a roof installation.
3. For improving splash-proofing, it is recommended to install the device to an upright position with the I/O cables directing downwards.

The front panel includes a battery and "a flip cover" GPS antenna. The GPS antenna can be covered with plastic, fiber glass or clothes, but NOT with metal.

SIGHT

The GPS antenna must have an unobstructed view to satellites at any time. In marginal conditions an external GPS antenna, possibly even a GSM antenna, must be installed.

Temperature ranges

- **Usage:** -20 to +55 °C with a standard Li-Ion battery (both models).
- **Charging:** Standard Li-Ion battery must not be charged below 0 °C.

SPECIAL NOTES CONCERNING BATTERIES

At temperatures below -25 °C, standard Li-Ion batteries will not supply power and the device (using standard Li-Ion batteries) cannot be used. Upon warming up, the battery will function properly again.

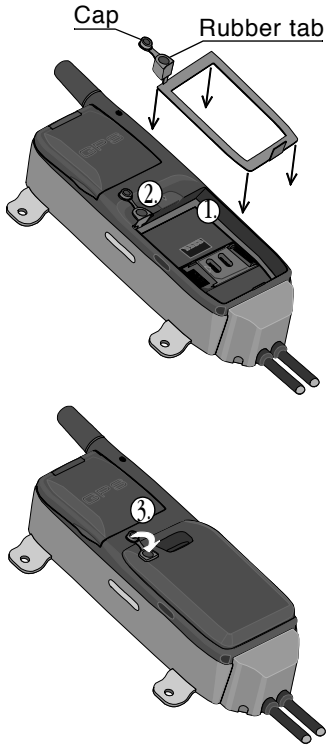
If the device is frequently used below 0 °C, a standard Li-Ion battery must be replaced with a special backup battery including a built-in switch, which controls temperature and prevents charging whenever necessary.

Mechanical durability

The device is not categorized for damp conditions. In case the device will be permanently used in such conditions, it must be provided with separate housing, suitable for antennas, as well.

However, overall dust and water protection of the device can be improved considerably by using o-ring seals with screws, and inserting the rubber seal of the battery in place correctly.

INSERTING THE BATTERY AND RUBBER SEAL



1. Place the rubber seal so that it lies at the bottom of the battery hole (see the picture).
2. Fit the rubber tab into the recess in the upper left corner.
3. In case an external GPS antenna is NOT plugged in, lift the cap on the top of the rubber tab. This needs to be done for improving the protection against dust and water.
4. Fit the battery in place. The idea is that the battery will be securely fastened in the battery hole.
5. Push the battery into the device until it locks in place, and lift the release catch into an upright position (a click sound is heard).
6. In case the inlet for the BWTrackbox cable is pierced, but the BWTrackbox cable is not in continuous use, the hole needs to be covered with some waterproof material, such as a piece of firm tape or silicon.

Removing the battery: Push the release catch downwards and pull the battery carefully away from the device.

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USER INTERFACE

Invisible mode

The device can be configured to work in an invisible mode to make it more difficult to detect. Under the circumstances only some of the basic LED patterns are displayed indicating events, such as an incorrect pin, power up/down.

In the invisible mode, the LED´s are not lit, e.g. in these cases: an incoming call, an active call, an incoming MPTP message, an outgoing position message, an outgoing battery low message, an outgoing emergency message.

Indicator LEDs

Symbol	Meaning
■	On for 1 second
□	Off for 1 second
■	On for half a second
□	Off for half a second
...	Starts over from the beginning of the pattern

All the LEDs are lit in union and show	Status/Action
■□■□■□■□■□■ (once)	Answers an incoming call. - NOTE: In order to work, a valid SIM card must be inserted, and the device must be turned on, and the auto answer setting must be turned on.
■□■□■□ ■□■□■□■□■ (once)	An MPTP message is received and accepted. - NOTE: In order to work, a valid SIM card must be inserted, and the device must be turned on.
■□...	Incorrect PIN. It causes the device to power-down.
■ ■ (once)	Sending of a status message succeeded.
■□... (five times)	Sending of a status message failed.

Battery LED (green) shows	Battery status
■... (constantly on)	4/4 (battery is full)
■ ■ ■ ■■□■□... (6 sec. sequence)	3/4
■ ■ ■■□■□■□... (6 sec. sequence)	2/4
■ ■■□■□■□■□... (6 sec. sequence)	1/4
■□■□■□■□■□.. (5 sec. sequence) - NOTE: The pattern cannot be seen, if the LEDs are lit for some other reason at the time of this event, or if less than 5 minutes has passed since the event was last invoked.	0/4 (battery is low)
■□... (2 sec. sequence) The LED flashes current battery status in turns with charging.	Charging.

GPS LED (yellow) shows	GPS status
■... (constantly on)	Valid fix
■□□... (in sequence of 2 seconds)	Sleeping (zzz)
■□... (in sequence of 2 seconds)	Searching/Locking
□... (constantly off)	Off
■ (lit for 3 seconds) - NOTE: The LED pattern cannot be seen, if the LEDs are already lit for some other reason at the time of this event.	A valid position fix is finally acquired after searching for a while.

GSM LED (red) shows	GSM status
■... (constantly on)	Network available
□... (constantly off)	Off
■□... (in sequence of 2 seconds)	Searching
■□■□■□■□.. (in sequence of 6 seconds)	No network
■... (flashes in every 5 seconds, if the LED is not already lit for some other reason)	Power is on
■□■□■□■□■...	Active call
■□□.. (2 sec. sequence)	Invalid SIM

Keys

Side key	Function	Procedure
(press and hold down for a few seconds)	Power-up	The device is turned on. All the LEDs are lit. The device sends a message via the configuration port to inform a possibly attached external device of the power-up. An automatic PIN entry and a removal of all short messages found on SIM will take place. - NOTE: For the automatic PIN entry, the PIN code must be pre-programmed into the device.
(press and hold down for a few seconds)	Power-down	The device is turned off. All the LEDs are lit.
(press briefly)	Indicator refresh	Idle mode is entered. All the LEDs will start to show their current status.

FOR MORE INFORMATION, DETAILED DESCRIPTIONS AND FUNCTIONALITY OF THE DEVICE, SEE THE *TRACKBOX OPERATING INSTRUCTIONS*.

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